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IDENTIFICATION OF GEOSTRUCTURES OF CONTINENTAL CRUST PARTICULARLY AS THEY
RELATE TO MINERAL-RESOURCE EVALUATION

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Type I Progress Report
ERTS-A

- a. Title: Identification of Geosstructures of Continental Crust
Particularly as They Relate to Mineral-Resource Evaluation

ERTS-A Proposal No.: SR 180

- b. GSFS ID No. of P.I.: IN 387

- c. Statement and explanation of any problems that are impeding the progress of the investigation:

The Investigators elected, at the time of submitting the ERTS-A proposal, to request data only, and no financial support for personnel or equipment in performing the investigation. This decision was based on the rationale that the most effective and most in-depth demonstration of the application of ERTS data would be achieved by its use by geologists of Alaskan Geology Branch (30+ individuals) as an adjunct to and in the course of regularly funded research. Direct application results of use of ERTS data, previously reported and reported herein, bear out this rationale. However, this experience also has shown that, while the ultimate benefit of use of ERTS data will be great, the speed with which these benefits will be realized is slower than if a specifically funded parallel program element existed to search out additional applications and catalyze the immediate use of ERTS data in regularly funded on-going research. To attain this goal, the ERTS-B proposal was prepared to provide a separate program element, and funds for support of personnel were requested.

In short, while the investigation as designed is not being impeded, had it been designed as a separate program element with personnel funding, its progress would have been greatly enhanced.

- d. Discussion of the accomplishments during the reporting period and those planned for the next reporting period:

During the report period, a proposal for ERTS-B investigations, stressing examination of spectral response of vegetal and lithologic types as indicators of structure and lithologic distribution was completed. A change in the investigation profile was instituted to permit preparation for and beginning of these studies in the 1973 season.

A paper summarizing results to date and analyzing the resource

applications of these results, entitled "Preliminary geologic application of ERTS data in Alaska" by E. H. Lathram, I. L. Tailleir, W. W. Patton, Jr., and W. A. Fischer, was prepared for the ERTS-1 Symposium March 4-9 and was presented by W. A. Fischer. Lack of funds for travel prevented attendance of the Principal and Co-Investigators at the Symposium.

The Co-Investigator and W. A. Fischer completed a manuscript analyzing in depth the regional distribution of the east-trending lineation in lakes first recognized on image 1004-21395, the relation of this lineation to geologic, geophysical reflection, gravity and magnetic data available, and the petroleum resource implications of the possible buried structures these data suggest. This paper, "ERTS data reveal possible buried structures in northern Alaska" by W. A. Fischer and E. H. Lathram, is being submitted to a petroleum industry trade journal for early publication.

The use of ERTS-1 imagery in properly depicting the distribution of structures in the compilation of the Geologic Map of Northern Alaska by E. H. Lathram is continuing, and use of these images to extrapolate mapped geology into unmapped areas is planned. Similar use of ERTS imagery in the final stages of compilation of a new small-scale Geologic Map of Alaska by H. M. Beikman is also planned.

1:250,000-scale enlargements of images 1009-22090, 1046-22143 and 1046-22145 were obtained, covering the western DeLong Mountains, Kukpuk River lowland and Lisburne Hills in northern Alaska. I. L. Tailleir is compiling geologic maps of this area, using the ERTS images as a base map. There are no geologic maps of most of this area, because of the structural complexity of the strata and the sparsity of field information. The enlarged ERTS image bases provide a more graphic representation of the structural pattern than could conventional maps, and assist significantly in extrapolating field data into unmapped areas (see Significant Results (e) below).

e. Discussion of significant scientific results and their relationship to practical applications or operational problems including estimates of the cost benefits of any significant results (To be prepared in scientific abstract form of 200 words or less):

See attached statement. Category 4K.

f. A listing of published articles, and/or papers, pre-prints, in-house reports, abstracts of talks, that were released during the reporting period:

1. Lathram, E. H., Tailleir, I. L., Patton, W. W., Jr., and Fischer, W. A., 1973, Preliminary geologic application of ERTS imagery in Alaska [abs.]: Symposium on Application of ERTS-1 data, Program, NASA, Greenbelt, Maryland, March 4-9, 1973.

2. Lathram, E. H., Tailleux, I. L., Patton, W. W., Jr., and Fischer, W. A., (in press) Preliminary geologic application of ERTS imagery in Alaska: Symposium on Application of ERTS-1 data, Proc., NASA, Greenbelt, Maryland, March 4-9, 1973.

g. Recommendation concerning practical changes in operations, additional investigative effort, correlation of effort and/or results as related to a maximum utilization of the ERTS system:

The maximum utilization of the ERTS system in overall resource and environmental applications requires a continuity of data. The delay of ERTS-B launch raises the spectre of a gap in data should ERTS-1 fail. The failure of the RBV tape recorder, and then of the RBV system showed the fallibility of the systems. The current failure of the MSS tape recorder is an additional blow. While the immediate effect will be felt in countries lacking a receiving facility (representing a serious and nationally embarrassing gap in data provision for foreign countries and investigations), the long-range effect on U.S. applications is to heighten the possibility of MSS failure and a gap in ERTS data before ERTS-B is launched.

All effort should be focused toward an early follow-on by ERTS-B.

It is also recommended that in releasing this and other reports to NTIS for publication, names of persons identified within the text be retained even though they are not named Investigators. This ensures that both credit and responsibility for identification of an application will accrue to the Scientist who performed the actual work.

h. A listing of data of any changes in Standing Order Forms:

Change of data requested from 9" paper prints to 70 mm and 9" transparencies, and the addition of a data requirement for the period May 1 to August 1, 1973, was accomplished in conference with the Technical Monitor. The change to transparencies will permit initiation of color enhancement study of structure and lithologic distribution, and the addition of the Spring-Summer 1973 period will ensure complete coverage of Alaska (now incomplete) as well as comparison of spectral changes in geologically affected vegetation biomes from one growing season to another and throughout a growing season.

i. ERTS Image Descriptor forms:

None.

j. Listing of date of any changed Data Request forms submitted to Goddard Space Flight Center/NDPF during the reporting period:

Verbal submission of change in data request (see (h) above) in conference with Technical Monitor January 29.

k. Status of Data Collection Platforms (if applicable):

Not applicable.